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PRINTING MACHINE

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The invention pertains to a printing machine, preferably a flexographic printing machine, with an endless belt that runs over return rollers and/or guide rollers and which carries the printing plates, and with anilox rollers and impression cylinders that can be positioned at the belt or the printing plate, and preferably in the region of a return roller, where a supporting film that supports the printing plates is adhered to the flexible endless belt, and an elastic equalizing layer is provided between each printing plate and the flexible endless belt.

A printing machine with a belt-like, continuous printing plate support is known from DE-PS 861 566, for example. In order to be able to press the individual regions of the printing

plate with the required contact pressure onto the web that passes between this printing plate and the impression cylinders—wherein the different contact pressure of dots of different diameter and line-shaped elevations on the printing plate must be taken into account—it is known that an elastic equalizing layer, e.g., one comprising a synthetic elastic foam material, can be positioned between the supporting film, which is adhered to the printing plate or which supports the printing plate, and the endless belt. The gap between the impression cylinder and the press cylinder, which supports the endless supporting belt and which can be formed via a return roller, is selected in such a way that the printing plate, which passes through the roll gap, is pressed with the required force against the web which is to be printed and which is supported by the impression cylinder, as a consequence of the elastic deformation of the equalizing layer.

In the case of the known layer assembly for fastening the printing plate to the endless supporting belt, it has now been shown that the elastic equalizing layer is destroyed prematurely as a consequence of the large stresses that act on it, so that problem-free printing is no longer possible. This premature destruction of the elastic equalizing layer can be attributed to the feature that it is attached adhesively on the one hand to the endless supporting belt and on the other hand to the supporting film that supports the printing plate, where both are flexible, though in principle inelastic, and thus not essentially stretched or shortened as a result of stresses. The elastic equalizing layer, which itself is usually constructed in the form of an adhesive belt layer that connects the supporting film to the endless supporting belt, tends to be deformed into the shape of an annular sector during its rotary movement around a return roller, and its outlying regions are stretched while its inner region is not subjected to stretching or shortening since it is attached adhesively to the endless supporting belt. The nature of the deformation of the elastic layers that are adhered to the endless supporting belt can be seen, for example, from the deformation of pliable elastic letterpress printing plates that is illustrated with Figure 1 in DE-PS 861 566. If the elastic equalizing layer's deformation, which results from the changes in stress in the known layer assembly, is prevented by clamping it between the endless supporting belt and the supporting film, which both permit essentially no elastic deformations, then the elastic equalizing layer is subjected to considerable forces and tensions as well as shearing strains during its rotary movement over a return roller, where these prematurely destroy the equalizing layer. The equalizing layer can become prematurely fatigued as a consequence of these high stresses, so that it can tear and crumble into pieces.

The problem of the invention is therefore to create a printing machine of the type that was described at the beginning, in which the elastic equalizing layer which causes the elastic contact pressure on the printing plate is not subjected to any forces that as a consequence would lead to the premature destruction of the elastic equalizing layer or to its becoming prematurely unusable.

According to the invention, this problem is solved for a printing machine of this general type by positioning the elastic equalizing layer between the printing plate and the supporting film.

In the printing machine according to the invention, the flexible—though otherwise essentially inelastic—supporting film is thus adhered directly to the endless supporting belt, wherein the flexible equalizing layer is positioned between the printing plate and the supporting film, so that the printing plate is then fastened to the supporting film via the elastic equalizing layer, with the latter being adhered to both. Since the printing plate is adequately elastic, it undergoes approximately the same stretching movements as the elastic equalizing layer, so that the elastic equalizing layer is exposed only to much smaller forces and shear stresses during its rotary movement over a return roller.

The equalizing layer advantageously comprises a synthetic foam material, e.g., PU foam, an elastomer, or rubber.

The supporting film can comprise PE.

The printing plate advantageously comprises a photopolymer.

In the layer assembly according to the invention, the thickness of the elastic equalizing layer is advantageously selected such that the thickness of the printing plate is more than twice the thickness of the equalizing layer.

The supporting film is advantageously attached adhesively to the supporting film [sic; belt] via a flexible adhesive layer.

In a printing machine with a plate cylinder, the feature is provided, according to another form of embodiment of the invention, that the printing plates are attached to the return roller by means of the layer assembly according to the invention that has been described above. If, as is known in the prior art, the supporting film, which is adhered directly to the printing plate, is connected directly to the return roller via the elastic equalizing layer, which can be constructed in the form of a self-adhesive elastic equalizing layer, then difficulties naturally arise when detaching the printing plates when these are to be replaced by other printing plates. When the printing plates are removed, tearing naturally takes place through the elastic equalizing layer, which is then still adhered in part to the return roller jacket, so that this layer can be detached completely only with difficulty. However, a much simpler detachment is possible if the stable supporting film that supports the equalizing layer and the printing plate is adhered directly to the return roller.

An embodiment of the invention will be described in more detail below by means of the drawings. The following aspects are shown therein.

Figure 1 shows a schematic side view of an endless belt that supports printing plates and for which a return roller has been positioned between an anilox roll and an impression cylinder;

Figure 2 shows a schematic longitudinal section through an endless supporting belt that supports a printing plate using a known layer assembly; and

Figure 3 shows a section that corresponds to Figure 2 but uses a layer assembly according to the invention.

A return roller 3 is mounted between the anilox roller 1 of an inking system and an impression cylinder 2, wherein an endless supporting belt 4 that supports the printing plates 6, 7, runs over this return roller. The return roller 3 is provided with radial teeth 5 that engage with appropriate holes in the supporting belt 4. The supporting belt 4 is made of a tough material of adequate strength, e.g., PE.

The known type of attachment of printing plates to the endless supporting belt 4 can be seen from Figure 2. The printing plate 8, which comprises a photopolymer, for example, is fastened to a supporting film 9 that is made of a layer of a tough flexible material that nevertheless has low elasticity, for example PE. This supporting film is connected to the supporting film [sic; belt] 4 via a synthetic foam adhesive layer 10. The synthetic foam film 4 [sic; foam adhesive layer 10], which forms an elastic equalizing layer, is thus clamped between the endless supporting belt 4 and the supporting film 9 so that it cannot undergo deformation as a consequence of the prevailing stress circumstances during its rotary movement over the return roller.

The layer assembly according to the invention can be seen from Figure 3. The printing plate 8, which comprises an elastic photopolymer, for example, is connected, or adhered, directly to an elastic equalizing layer 11 that itself is connected, or adhered, to the supporting film 12. The supporting film 12, which is made of a tough material of low elasticity, is adhered directly to the endless supporting belt 4 by means of an adhesive layer 13.

Claims

1. Printing machine, preferably a flexographic printing machine, with an endless belt, which runs over return rollers and/or guide rollers and which carries the printing plates, and with anilox rollers and impression cylinders that can be positioned at the belt or the printing plates, and preferably in the region of a return roller, in which the supporting films that carry the printing plates are adhered to the flexible endless belt and an elastic equalizing layer is provided between each printing plate and the flexible endless belt,

characterized by the feature

that the elastic equalizing layer (11) is positioned between the printing plate (8) and the supporting film (12).

2. Printing machine according to Claim 1, characterized by the feature that the equalizing layer (11) is made of a synthetic foam material, an elastomer, or rubber.

3. Printing machine according to Claim 1 or 2, characterized by the feature that the supporting film (12) is made of PE.

4. Printing machine according to one of Claims 1-3, characterized by the feature that the printing plate is made of a photopolymer.

5. Printing machine according to one of Claims 1-4, characterized by the feature that the thickness of the printing plate (8) is more than twice the thickness of the elastic equalizing layer (11).

6. Printing machine according to one of Claims 1-5, characterized by the feature that the supporting film [sic; belt] (4) is adhered to the supporting film (12) via a flexible adhesive layer (13).

7. Printing machine with a return roller, characterized by the feature that the printing plates are fastened to the return roller jacket using the layer assembly according to one of Claims 1-6.

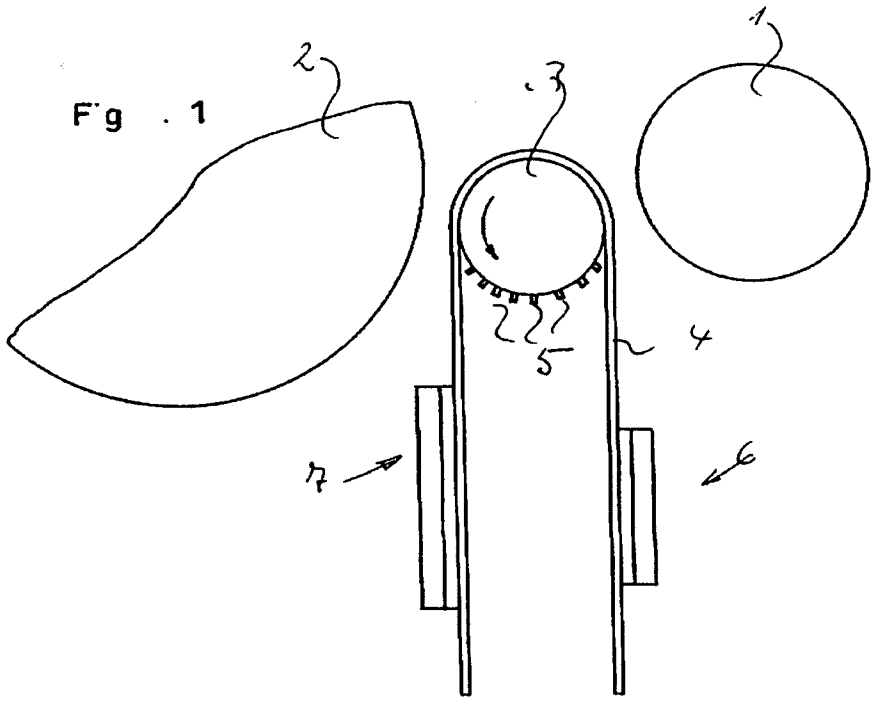

Fig. 2

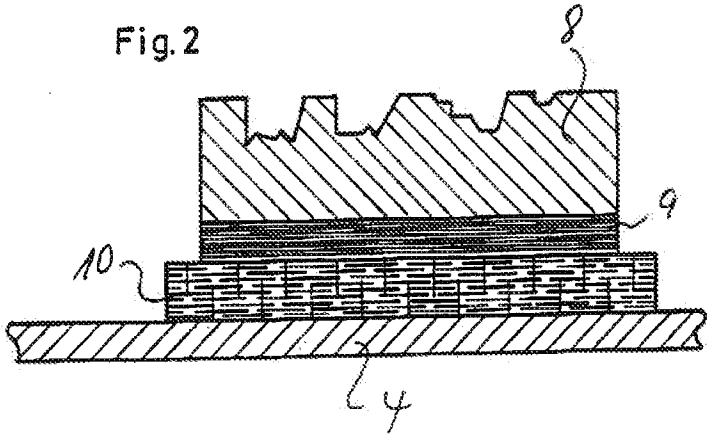

Fig. 3